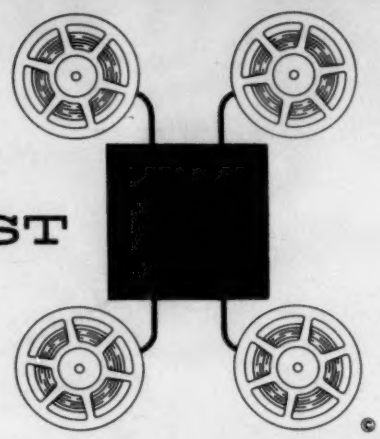
DATA PROCESSING DIGEST

1140 South Robertson Blvd., Los Angeles 35, California

a publication of Canning, Sisson and Associates, Inc.



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VOLUME 5 NUMBER 10

OCTOBER, 1959

THE UNIVERSITY OF MICHIGAN
OCT 13 1959
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General Information

ACCOUNT NUMBERING FOR EDP SYSTEMS

STORES, July-August 1959; pages 61, 62

Several account numbering systems for retail stores, along with their good and bad points, are described. The Jones Store, Kansas City, uses the account number for internal control only; hence it needs no checking digit. The code consists of the first letter of the customer's last name plus a six-digit number. For each letter of the alphabet there is a deck of master cards numbered 1 to 1000. Old accounts were assigned numbers 100 numbers apart. New accounts are inserted halfway between existing numbers in alphabetic sequence. Jones Store is planning to adopt a one-line summary card statement in the near future.

Peck & Peck had unhappy experience with their account numbering system. They started with a nine-digit number, but found it did not accommodate expansion and had to change the form twice, adding a digit each time. Their 11 digit number still gave them problems, so they abandoned the alpha-numeric system, and have assigned numbers in straight numeric sequence. A master file of numbers is kept, from which new account numbers are drawn as needed. The credit file is maintained alphabetically. They have found no serious cross-referencing problems and the system is practically error-free.

Woodward & Lothrop uses the ARANS (Alpha Random Access in Numeric Sequence) system. Accounts are filed in numeric sequence and grouped into established subdivisions of the alphabet, but within each of these letter groups the accounts are not kept in alphabetic order. To locate accounts when number codes are not known, the company has devised Scan-Dex ((see DPD, April 1959, page 14, "Retail Account Numbering")), a special tab for the credit application blank which allows the alphabet group containing the customer's name to be scanned and the card located.

Mr. McBrier of Woodward & Lothrop recommends that stores establish numbering systems on a community basis, so that one account number may be placed on the charge plate cooperatively issued by a community of stores.

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ELECTRONIC DATA PROCESSING FOR RETAILERS

Report of Electronics Committee of NRMA Retail Research Institute

This most impressive report is a compilation of papers presented at the first Seminar of the NRMA-RRI Electronics Committee, April, 1959, and committee reports of findings in their committee work. The report contains much practical and valuable information for retailers, and indicates the real depth of study being undertaken by this important research group. The papers include explanations of the function of EDP in a retail organization, planning for EDP, point of sale and print-punch equipment and procedures, data origination from the sales check and from marking room operations, operations research in the retail business, character recognition, appraisals of equipment, and many other areas of study. Certainly, any retail establishment which thinks it is a potential user of EDP equipment, as well as manufacturers of such equipment, manufacturers who sell to retail establishments, and consultants who help set up EDP systems, would be well-advised to obtain a copy of this report, and any others issued by the Electronics Committee. For information about obtaining a copy of the report, write to Miss Ethel Langtry, Research Director, Retail Research Institute, National Retail Merchants Association, 100 West 31st Street, New York 1, New York.

RETAIL STORES STUDY SCANNING EQUIPMENT

The Electronics Committee of the National Retail Merchants Association's Retail Research Institute has set up a sub-committee to develop standards for optical scanning equipment used in data processing systems in retail stores. Included in the standardization studies will be saleschecks, order forms and merchandise tickets. The committee plans to meet with manufacturers of optical scanning equipment in about six months and present a final report in a year. The committee hopes to prepare specifications for the most desirable locations for imprinting on the various forms used by stores, as well as for type face, size of type and number of digits to be read in a single scan. The scope and work of the study will be similar to that of the American Banking Association for the banking industry. ((From a news release))

WITH ELECTRONICS IN THE OFFING—"WHAT TO DO 'TIL THE DOCTOR COMES"

DEPARTMENT STORE ECONOMIST, July 1959; pages 20, 21

Several factors are combining to lead department stores and other retailers to install electronic data processing systems. These are higher expenses and wages, or a dwindling in personnel as they are lured by higher-paying industries; an increase in credit buying and

attendant account servicing requirements. Operations will probably become centralized, since records will be important to management as well as operating personnel. Numerical coding of account numbers will be mandatory. Stores are advised to examine techniques, performance data and other systems to develop requirements which match store operations.

DIGITAL COMPUTER PRIMER

E. M. McCormick, U. S. Naval Ordnance Laboratory, Corona, California
Published by McGraw-Hill. $7.50

Although this is another entry in a crowded field, it appears to be among the better ones. The field is that of the curious layman or the questioning student. This is a very good introduction to electronic data processing from the standpoint of using the computer. The text progresses from the way in which a computer is organized, through elementary coding, a discussion of numbering systems, the way in which computers make logical decisions, a simple explanation of the electronic "workings" of the various elements of the computer, and several chapters on programing and coding. These latter chapters are deliberately simple and elementary. They offer a good basic explanation of what is required of the would-be programer or operator. Two appendices, on the mathematics of logic, and the distribution of words in the text, along with a short bibliography, complete the text.

AVAILABLE ELECTRONIC HARDWARE FOR BANKING USE

Neal J. Dean, Booz, Allen & Hamilton, New York
Report issued by Booz, Allen & Hamilton

In this talk made to NABAC in April, 1959, the author presents some of the features in banking equipment which automate the check-handling system to varying degrees. Four specific types of equipment are discussed:

Varying degrees of automation

1. An encoder which may be attached to a distribution type proof machine, or may be of the unit variety.
2. A sorter which is required for fine sequencing the checks.
3. A sorter-converter which is used for batch control, establishing the dollar totals, and as input to the electronic computer system, either directly or via the input media.
4. Utility encoders which are used to supply missing information on documents or to prepare substitute documents.

The economic feasibility of each of these types of equipment must be examined in each individual bank's case. Four steps are suggested for banks: study their own operations to determine the requirements of their system; lay out the system in detail; measure the various automatic devices available against this system design to find the equipment which best meets the needs; and finally, make an economic evaluation of the proposed system.

The dilemma of small banks

It is predicted that in about 5 to 10 years a large percentage of checks will be encoded by the first bank handling the item, and that subsequent processing in cooperating banks will be automatic. Federal Reserve banks will be prime movers in bringing this about since a very large percentage of clearing items are handled through these banks.

There is the dilemma of small banks, however. One possible solution would be cooperative data processing centers for a number of banks in a geographical area, similar to the cooperative insurance data processing center, SPAN, in Hartford. Another suggestion is that metropolitan banks service their correspondents by performing the check handling and bookkeeping functions for them.

For a copy of the report, write to Mr. Neal J. Dean, Booz, Allen & Hamilton, 380 Madison Avenue, New York 17, New York.

ABA COMMITTEE TO STUDY GROUP ELECTRONIC UNIT USE

U. S. INVESTOR, July 25, 1959; pages 7, 8

The committee on savings management and operations of the A. B. A. 's Savings and Mortgage Division, is studying plans for promoting the use of cooperative computing centers by banks, particularly small banks which cannot afford to install large EDP systems on their premises. In addition the committee will present a series of regional conferences to encourage interest in such cooperative ventures and to demonstrate the feasibility and economy of joint usage of modern equipment.

COMPUTER CENTERS... WIDEN SERVICES TO SMALL BUSINESS

OFFICE MANAGEMENT, August 1959; pages 29-31, 78

RCA is the newest manufacturer to open computing centers. Their first one is in Camden, New Jersey. This fall they will open a center in the Wall Street financial district for the exclusive servicing of brokerage firms. The center will be linked by direct wire with the brokerage houses using the service. Among the clients for service bureaus are the Marshfield High School in Coos Bay, Oregon which uses a service bureau to prepare report cards and schedule classes; and an industrial organization employing 3000 people to schedule vacations quickly and impartially.

IBM DATA CENTERS

IBM Corporation will establish from twenty-five to thirty 7070 Datacenters in major cities. Any business organization may use the facilities of the Datacenters on a self-serve basis, using as little as 15 hours of computing time a month. Rates will be under $300 an hour. Customers will do their own programing and will be completely in charge of their own work on the computer during the hours for which they have contracted. The Datacenter operations differ from those of the Service Bureau Corporation (IBM) which performs a total package operation from application study to delivery of results to the customer. ((From a news release))

OBSOLESCENCE OF ELECTRONIC DATA PROCESSING EQUIPMENT REAL OR FANCIED

Neal J. Dean, Booz, Allen & Hamilton, New York
Report issued by Booz, Allen & Hamilton

Obsolescence of equipment is of three kinds; functional, technological, and economic. Functional obsolescence of electronic equipment would be more likely to be due to the failure of the equipment to meet changed requirements, than to the wearing out of the equipment, since computing equipment should be good for at least 10 to 20 years with good care. To avoid obsolescence through changed requirements, management should include forecasting needs for at least 5 to 10 years in planning the installation. If the installation must be changed, a second machine, or additional components might be added. If it becomes necessary to replace an existing installation with one having greater capacity, the conversion to the new system will be far less expensive than the original conversion, since many of the elements of cost in the original conversion will be either reduced or eliminated. It is estimated that the second conversion may run less than 50% of the cost of the first one.

Second conversion is less expensive

Technological obsolescence is not likely to hamper a present-day installation, since most delivered computers are already "obsolete" compared with the research computers being developed by the manufacturer. "'True' technological obsolescence probably only occurs with a technical 'breakthrough'....[and] will occur when an internal memory can be made sufficiently large, compact, inexpensive, and yet with fast enough access to store a company's main files and provide direct access for both transaction posting and inquiry reference."

In economic obsolescence, one must consider the interim savings which may occur from the present installation, even though it may be replaced by more advanced equipment. This interim savings may justify a double conversion, particularly when the second conversion may be less expensive. "Where the interim savings will not be large....the probability of economic obsolescence arising within the payout period of the proposed installation is much greater."

Therefore, a consideration of obsolescence emphasizes the importance of determining the system requirements before selecting equipment. This has two important advantages: the system will determine the equipment, and it allows the selection of the latest and most advanced equipment, since it is the last item in the preliminary planning period. Finally, a realistic appraisal of the conversion cost will enable management to properly assess the risk of economic obsolescence.

For a copy of the report, write to Mr. Neal J. Dean, Booz, Allen & Hamilton, 380 Madison Avenue, New York 17, New York.

FAST, A NEW USER GROUP

FAST is a new user group for the Signal Corps FIELDATA Computers, including the MOBIDIC, BASICPAC, COMPAC, and IMPAC. The first meeting was held in April, 1959. The third meeting will be held at Fort Monmouth, New Jersey, November 3, 4, and 5. Further information may be obtained from Capt. G. H. Banister, chairman, or Mr. Bruce Clark, secretary, both of Fort Huachuca, Arizona; Telephone: GLadstone 8-3311, Ext. 4733. FAST stands for FIELDATA Applications, Systems, & Techniques.

CATALOG OF TECHNICAL REPORTS

The Office of Technical Services of the U. S. Department of Commerce is offering a Catalog of Technical Reports on computers, including digital, analog and special types. Most of the titles are highly technical in nature, but include papers and reports on applications as well as hardware. The catalog may be ordered either from the Office of Technical Services, Department of Commerce, Washington 25, D. C.; or from the Library of Congress, Photoduplication Service, Publications Board Project, Washington 25, D. C. Price: 10¢.

THE IMPENDING EDP PERSONNEL CRISIS

Harry H. Fite, Lester B. Knight & Associates, Inc., Washington, D. C.
ARMED FORCES MANAGEMENT, July 1959; pages 13-15, 48

A study of government personnel policies and requirements for EDP reveals:

1. The government will be outbid on the labor market.
2. Experienced EDP people will leave government rather than enter.
3. Internal recruitment of competent people will become more difficult.
4. Business applications will suffer more than scientific ones.

5. EDP people must become increasingly sophisticated in concepts of management.
6. Long-range and government-wide manpower policies will be required.

The 4000 persons presently engaged in EDP occupations in government will increase to nearly 13,000 by 1963 with a payroll of $80-million. These figures are based only on those agencies now using electronic computers. When other agencies join the field, the figures will increase correspondingly. On the other hand, changes in hardware and programing techniques may temper these figures somewhat.

A lack of standards

While Civil Service EDP standards are generally satisfactory, there are two exceptions: a nearly unanimous view that more math should be required for scientific applications than for business, and that specific experience requirements for programers and operators are introduced at too low a rate. Also there appear to be too many divisions of labor between programers and operators on one hand, and analysts and programers on the other, causing some friction among EDP staff members.

There is little standardization among agencies in either hiring or training, with a wide range of interviewing and testing techniques. Turnover is at the rate of nearly 20% per year.

Some recommendations made by the consulting firm which made the study are: a review of government personnel policies; use of a "wage board" approach for setting salaries; top management attention to personnel aspects of EDP; frequent re-appraisal of job standards, allocations of individual positions, and pay-scales during these early shakedown days of EDP; standardization of interview records, rating, training, and written tests; standards for selection; selection of key personnel on basis of high native aptitude, imagination, and breadth of outlook; the cadre principle of forming a new organization with a nucleous of experienced people from older groups; training of gifted junior personnel for use as task forces on new installations and studies; cooperation rather than competition of government agencies in recruitment; concentrated effort to improve training.

The need exceeds the training capacity

This last area of concern includes the most acute problems revealed by the study. "The gravest of these lie in the gap between projected need for indoctrination of top management, training of ADP administrators and management analysts, and the currently-organized capability within the government for this purpose. Really extraordinary and bold measures need to be taken at once because, in addition to the large size of the requirement, the timing is urgent. Something equivalent to a domestic intra-governmental 'technical cooperation' program is recommended."

It is suggested that this take the form of seminars to train top management in the principles of management and implications of EDP. It is pointed out that until top management develops an under-

standing of EDP (ADP), technicians cannot do an effective job. In addition, educational resources outside the government should be used. "Contracts should be let to universities to develop courses according to government specifications where existing offerings don't meet the needs. . . . Extraordinary expedients, like summer employment of college professors in government computer installations or financing of computer rental on certain campuses for training purposes should be considered." In addition, consultants, associations and service bureaus should be used. A massive training program similar to the wartime Statistical Officers' Course developed for the Air Force should be considered.

AUTOMATION OPENS NEW HORIZONS THROUGH NEW DEVELOPMENTS IN FIRST HALF OF 1959

OFFICE MANAGEMENT, July 1959; pages 23-25, 64, 70

This editorial report of the progress of automation in plant and office includes some comment on a statement made by R. C. Ludlow, treasurer, R. C. A. Victor Co., Ltd., Montreal. Speaking to the National Office Management Conference in New Orleans in May, Mr. Ludlow predicted that the office organization of the future will probably consist of three distinct planes of workers: machine tenders; programers, analysts, and research personnel; and decision-makers. If this stratification comes about, it will raise some problems in the utilization of workers. Automation is claimed to raise the standards of jobs so that they become less routine and more stimulating. But what, asks the editor, will happen to those people who are much happier--and much more effective--at dull, undemanding jobs than they are at challenging spots? Will they be able to function in jobs calling for more initiative and more ingenuity? And, what will happen to the workers in supervisory levels now if the present large groups of basic clerical workers found in most large offices are dispersed?

What happens to those who enjoy dull work?

Moreover, the editor continues, if the prospect of a three-level heirarchy--machine-tenders (who would, as the machines themselves become more durable and accurate, tend to disappear); programers and analysts; and decision makers--should be valid, what lines will be developed to make possible advancement from one group into the others? If such a stratification should occur, and if it should be reinforced by physical separation of the groups (as has already occurred in some companies) many of the informal advancement lines now open in companies would be closed. Only much more elaborate selection and training programs than any we have seen to date would insure that the office would not arbitrarily be cutting off talented and valuable people from a chance to move up to top level responsibilities.

MANAGEMENT BY MEN OR MECHANICAL MORONS?

AUTOMATIC DATA PROCESSING, July 1959; pages 13-17

Chance and desperate men

This editorial poses the problem of the human element in automation, particularly of the office. It is suggested that specialization is the symptom of the pattern of commercial and industrial society that is being formed through the growing use of electronic computers. "While the executive decisions necessary in industry become increasingly difficult to make, the training of minds capable of making them is more and more ignored. We are training technical specialists but not capable leaders and makers of policy. The really big decisions tend more and more to be made by chance and desperate men. Not redundancy but dehumanization is the central feature, the characteristic effect, of mechanical management." If specialization is a necessity, asks the editor, "where and who are the supermanagers to manage the managers?"

The editor views the computer as clearing the manager of details, allowing him to concentrate on the planned course of the organization, but not encouraging exploration or inventiveness or imagination. "The pressure to conform to rule or pattern will be stronger than ever." Those who make the rules and design the patterns will have enormous power and responsibility. This "implies the acceptance of an enlightened aristocracy of management, subject to the ultimate restraint and control of a healthy political democracy. The alternative is a jungle of tyranny dominated by mechanical morons."

AUTOMATION, CYBERNETICS AND SOCIETY

F. H. George
Published by Philosophical Library, 1959. $12.00

This book is written in the context of the British sociological and scientific climate. The author is attempting to point out the inevitable changing of nature, stating that the development and the consequences of automation and the related areas of inquiry are a part of this basic characteristic of change. He suggests that future planning must include provisions for these changes. For example, he sees future education as a matter-of-course life-long activity, in which people study continuously to prepare for the new jobs as the old familiar ones become obsolete. He sees automation inevitably influencing man's leisure, his interests beyond his job, his culture, political status, and religious beliefs. He believes that man's greatest struggle will be in maintaining his individual freedom and identity against the pressures of standardization.

SO YOU THINK YOU WANT A DATA PROCESSING MACHINE

Cdr. M. Vance Fowler, Navy Supply Depot, Newport, R. I.
NEWSLETTER, Navy Supply Corps, May 1959; pages 40-46

SO YOU THINK YOU WANT A COMPUTER

ARMED FORCES MANAGEMENT, July 1959; pages 16-18

Factors to be considered by Navy departments before installing a computer are discussed. Summarized, they are as follows:

Insist on careful preliminary planning by top management's staff.

Select the machine to fit your application.

Select key personnel early--train them long and well.

Play down the savings aspect.

Insure that data are refined and purified before introduction to EDPM.

Schedule machine workload--a poor schedule is a big improvement over no schedule at all.

Provide a centralized information center to answer internal questions and coordinate problem solution.

Remember you're dealing with human emotions under very trying conditions. Practicing the Golden Rule becomes a matter of necessity.

Feeling what you practice makes the job far easier.

Eliminate the visitors--if you can do it gracefully.

Publicity--very tempting. Beware of it.

Physical movement of material--make it keep pace with the faster data processing.

ELECTRONIC DATA PROCESSING PROGRESS ISSUE

ARMED FORCES MANAGEMENT, July 1959

The entire issue is devoted to electronic data processing in government, particularly in the armed forces.

The Comparison of Major Computer Systems is a chart of 61 computers, from punched card calculators to special purpose and

experimental machines. Facts given are: model, manufacture, applications, numerical system, input, output, memory, power requirement, space requirement, cost, production record and reliability.

WHERE TO LOOK FOR TROUBLE IN A NEW EDP INSTALLATION

Ben Conway and D. E. Watts, Price Waterhouse & Co.
CONTROL ENGINEERING, July 1959; pages 104-107

Most difficulties found in EDP installations have been the result of overlooking, oversimplifying, or underestimating during the preliminating studies. These difficulties may be prevented if the preliminary study team is composed of experienced systems and computer specialists. If the right experience is not available in the company, qualified consultants should be hired. In staffing for EDP, the company should rely on themselves for selection, rather than on the computer manufacturer. In designing the system, top management assistance, skilled programing, and organization-wide cooperation is needed. In the installation and conversion phase, activities must be coordinated with machine delivery and installation.

Programing

PROGRAMMING BUSINESS COMPUTERS

by Daniel D. McCracken, Harold Weiss, and Tsai-Hwa Lee
John Wiley & Sons (New York), 1959, $3.50.

Here is the first top notch book on programing of electronic data processing machines. A number of books have been published on the subject, several of them recently, but the coverage in this new book by McCracken-Weiss-Lee is the best we have seen--comprehensive, authoritative, and up-to-date.

Excellent coverage and up-to-date on programing techniques

The authors begin their book with a brief discussion of files, and the function of files. With this background, they next cover flow charting, and then the computer (a realistic but hypothetical one, the DATAC). Only then do they begin to discuss the various aspects of coding. We like this approach far better than the conventional one of jumping right into coding and then casually getting around to flow charting many chapters later. We think the manufacturers' programing courses could benefit from this approach, too.

The book covers all the fundamentals of programing EDP computers in an easily understood style--including address computa-

tion, loops, index registers, and subroutines. Input-output devices and programs also are covered, along with methods of verifying program accuracy. But then the authors discuss subjects generally not treated in books on the subject, such as advanced techniques in magnetic tape programing (labels, sentinels, overlays, etc.), machine-aided coding (including Flow-Matic and FORTRAN), sorting, rerun techniques, and programing for large random access file storage.

The authors have provided exercises at the end of each chapter, so that the book may conveniently be used as a text on programing. But the coverage within the chapters is thorough--the book is 510 pages long--so that the book may be read profitably by people not taking a programing class. We feel that this is a book for the novice in electronic data processing, as well as for people much more experienced in the subject. This book belongs in every EDP library.

Equipment

THE MISSING LINKS IN NAVY'S AUTOMATED PRINTING PROGRAM

NAVY MANAGEMENT REVIEW, July 1959; pages 15-18

Rapid and automatic printing of books and technical papers is one link in the Navy's ADPS program which is about to be completely forged. Two types of rapid printing are described. One is the Microfilm Common-Language System which reduces copy to microfilm to be used in projection printers such as the Videograph ((see following articles)) to produce either a single copy of a collated publication or paper masters suitable for printing press use when a number of copies are needed.

The other system is the Sequential Card Common-Language System, in which punched cards each containing one line of copy, are fed into a sequential card camera, resulting in the production of photo-offset negatives.

The Videograph will be able to accept as input either roll or aperature card microfilm, and magnetic tape output from computers. The information will be printed on paper masters for use in duplicating offset presses.

Finished pages are produced at the rate of 200 pages per minute. Present models print 16,000 characters per second. Later models will increase the speed to about 60,000 characters per second, in both upper and lower case typography, proportional spacing, and more sophisticated format designs.

RAILROADS GET THE PICTURE

RESEARCH FOR INDUSTRY, July 1959; pages 8-10

SUPER-SPEED PRINTER USES TV PRINCIPLES

MODERN RAILROADS, August 1959; page 121

AN ELECTRONIC PRINTING PROCESS

THE OFFICE, August 1959; pages 88-90

TV camera's image is continuously printed

Stanford Research Institute has developed the Videograph Electrostatic Printer for A. B. Dick Co. at the request of the New York Central System. The Videograph is a high-speed duplicator which uses any of a number of media, including television. In the railroad application, a camera, specially designed to transmit a sharp, clear signal, looks at the material to be reproduced. This could be copies of waybills, or a moving train. It then sends its signal by coaxial cable or microwave to the printing equipment. Here the signal deposits on a continuous paper tape electrical charges which correspond to the dark areas of the image. The tape is dusted with black powder which clings to the charged portions of the surface. The powder is heated and pressed into the paper to make a permanent record. The entire system is extremely high-speed. For example, it can duplicate and print out 17,000 characters of elite typewriter type per second.

In recording the passage of a train, the unattended television camera is set up beside the railroad tracks at the outlying station. When the train passes, lights are automatically turned on, and the camera begins recording the cars' image as they pass by. The above-described procedure then takes place, reproducing a clear, printed picture of the train on a running two-inch paper tape. From study of the permanent picture, the yardmaster knows both the car numbers and their sequence in the incoming train and can plan accordingly.

A magazine publisher has ordered two Videograph printing systems in conjunction with an electronic computer for processing 10 million subscriber records. The Videograph equipment will edit the coded data it receives from the computer, to reject unwanted information and prepare rolls of address labels at 36 labels per second. Automatic paper splicing and roll changing mechanisms will make the operation continuous for the entire 10 million names. The operation will be done in one week on one shift.

Applications

A COMPREHENSIVE SYSTEM OF MERCHANDISE ACCOUNTING

J. G. Thompson, Boots Pure Drug Co. Ltd.
AUTOMATIC DATA PROCESSING, July 1959; pages 24-30

Merchandise accounting is defined as a system beginning at the branch ordering action, which provides management information for efficient retailing, warehousing, and production, while fulfilling the daily task of compiling figures for accounting purposes. At the present time the sales operation is being automated separately, with the idea of integrating it with the ordering operation in the future.

Beginning of integrated sales and ordering system

The British computer Emidec 1100 was selected. Branch orders are of two types: slow-moving items are hand written, using an item code of four letters, one of which is a check letter; basic items are ordered on special mark-sensed cards which the order clerk marks according to alignment with the corresponding item in a special order book. The items may be recorded in any sequence, as the computer program reassembles them in picking order for the warehouse.

The magnetic tape files consist of the master stock file and the "despatch and accounts file." As orders are processed, the computer checks the validity of the three-letter code in the slow-moving items, then rounds up orders for minimum quantity items which are under-ordered, records back-orders, substitutes items for out-of-stock items, sorts orders into warehouse bin sequence, and extracts shipping and invoicing information from the despatch and accounts file. A copy of the shipping order ("despatch note") is used as an invoice, with each line extended and totaled. The last line of the invoice is the total of current month's orders for the branch. Other print-outs are reports to each branch of back orders, and buyers reports on out-of-stock critical level of stock items, and outstanding orders. Future plans include more management information on stock levels and profit margins, and pre-calculated orders for management approval.

KEEPING YOUR MAINTENANCE RECORDS WITH A COMPUTER

Fred H. Winterkamp, E. I. DuPont deNemours & Co., Inc., Charleston, W. Va.
ISA JOURNAL, August 1959; pages 44-47

The Instrument Division of the duPont Belle Works uses a general purpose computer and punched card record forms for maintenance records. The objectives of the program are: equipment records, maintenance history, preventive maintenance scheduling, maintenance performance evaluation, and equipment performance evaluation.

Schedules are derived from last repair date

A master card for each instrument contains the equipment's maintenance records, and is used as an investment transfer form. This card carries the permanent inventory number assigned to the instrument. This number is also recorded on a stainless steel tag attached to the instrument. Maintenance record cards are provided to the field foremen, and are used by the mechanics as work orders for instruments needing maintenance. This work could consist of emergency repairs, or regular preventive maintenance. PM (preventive maintenance) Due cards are produced monthly by the computer based on the records of the maintenance record cards. If emergency repair has been done during the intervening scheduling period, the new schedule is figured accordingly. The PM report is sent to the field in the form of the maintenance record cards described above.

Evaluation of maintenance performance produces a monthly maintenance report which may be used in turn to evaluate equipment, predict failure probability, and assist in re-evaluating the maintenance schedule. These performance reviews and statistical studies are done continuously, because plant conditions and processes change, and the demands on equipment change correspondingly. In addition, these studies are used as a guide to future instrument design, and in making a choice between modernization or standardization of instruments.

The article does not mention which computer is being used.

FIDELITY'S MOVE TO ELECTRONIC BANKING

John A. Cost, Fidelity-Philadelphia Trust Co.
MANAGEMENT AND BUSINESS AUTOMATION, July 1959; pages 13-17, 38, 51

The Fidelity-Philadelphia Trust Company selected an RCA 501 system with eight tape stations. The system is designed on the building block principle so that it may expand as the bank's needs expand. The conversion is three-phased: first, punched paper tape input is used; second, magnetic ink imprinting of the bank's source documents will replace the punched tape; third, when all banks use MICR (Magnetic Ink Character Recognition), input will be fully automated.

Presently, the bank has placed on the computer the demand deposit application; future applications include personal loan accounting, trust accounting, commercial and mortgage loan accounting, savings accounting, and new areas of customer service which may be introduced.

An average of 90,000 transactions are processed each day in five computer runs: 1) proof run, 2) sorting run, 3) sorting and merging miscellaneous transactions, 4) main posting (up-dating) run, and 5) editing and reporting run. A graphic chart of the system is included in the article, and aids the reader in tracing through the complete system.

A FLEXIBLE APPROACH TO BANK AUTOMATION

BANKING, July 1959; pages 43, 116

The Chemical Corn Exchange Bank of New York has merged the check handling and record keeping operations of 94 offices in a central location. One thousand employees were moved and more than $5-million worth of equipment was installed in four acres of floor space. The bank chose equipment by planning precisely the way they wanted to mechanize. Past experience showed that certain types of equipment fitted parts of these plans exactly. They then determined what was needed to complete the full mechanization job and what each producer could contribute. The only remaining problem was in linking up the various machines. The bank found this system to be superior to selecting a manufacturer whose equipment came closest to performing their job, and then adapting their system to fit.

ELECTRONIC PROCESSING

J. P. Taheny, Argonaut Insurance Co., Menlo Park, Calif.
BEST'S LIFE NEWS, July 1959; pages 58, 62

Argonaut Insurance is just ten years old, and has been using a Burroughs 205 computing system since April 1957. The computer is used for policy writing, payroll solicitation, billing, issuance of claim checks, unearned premium reserves and preparation of accounting and statistical reports. The magnetic tape file is processed daily. By-products of this daily processing for 18,000 active policies include billing, and creation of a suspense file--a diary of the payroll information requests sent to employer-policyholders. The suspense file is automatically updated as the required information is returned. When there is no response after a certain period of time, the suspense file is relieved and second, third, or pre-cancellation notices automatically printed. The company is proceeding with other applications, including some sophisticated operations research work.

CARTE BLANCHE—THE AUTOMATED CREDIT CARD

MANAGEMENT AND BUSINESS AUTOMATION, July 1959; pages 8-12, 31-33

The Hilton credit card system, Carte Blanche, has been set up to be transferred eventually (probably when membership hits two million) to a magnetic tape computer system. All present equipment and procedures are compatible with a computer operation. Housing for the present machine accounting operation was prepared for housing a computer, including a raised floor, air conditioning, and ample space for additional equipment. Coded account numbers are assigned to each member, and built-in credit checks are a part of the complete system.

"These credit codes are one of the remarkable automation innovations of the Carte Blanche system. By applying a special formula to the information contained on the member's application, a code is obtained that governs the dollar credit limit to be extended. Another code measures a member's liability in regard to current and over-due charges. These codes provide a means for establishing a credit and payment pattern for each member. If the pattern changes in any given month, management receives an automatic warning of the change."

FORECASTING AND ASSIGNING TRAFFIC ELECTRONICALLY

S. E. Ridge, Bureau of Public Roads, Washington, D. C.
AMERICAN CITY, July 1959; page 118

Electronic computers are being used to forecast traffic distribution by "growth factor" models--the use of the principle of successive approximations. Once the growth factors are determined, with the cooperation of city planners and other interested groups in the area, the computer can produce a forecast of the zone-to-zone traffic volumes in a very short time. Previously, such forecasts were estimates, based on judgment and intuition, and by the engineer's personal knowledge of the city.

MOBILIZATION BY COMPUTER

The First U. S. Army, Governors Island, New York, has installed a Univac File Computer and a system by which 400,000 reservists could be called to active duty in the event of mobilization. The center can locate, select, and assign reservists according to their skills with greater accuracy and dispatch than by former methods, and maintains records in a compact and accurate manner.

ELECTRONIC PROCESSING GIVES CREDIT EXECUTIVE MORE MANAGEMENT TIME

CREDIT AND FINANCIAL MANAGEMENT, July 1959; pages 16, 17

In planning for their IBM Ramac 305 installation, Factory Motor Parts, Inc., San Francisco, included certain credit functions in the order processing program. These are:

A full sales history for each customer. As part of its routine order processing, the Ramac checks to see how much each customer owes.

A credit limit check. As it develops the outstanding balance against each customer, the Ramac compares the balance with a credit limit set by the credit manager and recorded in the computer's memory. If the credit limit has been exceeded, the computer adjusts its output so that the current order is placed on a COD basis. These orders are referred to the credit manager for special attention.

Overall credit supervision. The Ramac regularly computes and prints a complete aged trial balance on all the accounts on the first of each month, complete to the previous day's orders. In addition, the credit manager may call for special reports to be drawn from the computer when he needs them.

All of these benefits are virtually automatic and cost-free by-products of the routine order processing job for which the computer was originally ordered. They are possible because management analyzed its potential well in advance of ordering, and included them in the early plans.

Comment

MACHINES ARE SMARTER THAN I AM!

When computers first became generally available, there was a tendency to refer to them as "giant brains," implying some creative ability on the part of the machine. It soon became evident that, with current machines and programing techniques, the machines were not "smart" but merely slavishly followed instructions. The intelligence resided in the programer.

Machine learning for top management problems

Now, after only ten years it is becoming evident that computers can be taught to "think," in the sense that they can recognize concepts and apply them. There is evidence now that computers will be able soon to solve "ill-structured" problems, which are exactly the problems facing top management. When we can program computers to give useful results about ill-structured problems, described in words, then we will be able to apply operations research to top management problems, just as it is now being applied to middle-management procedures.

How can a computer be taught to think? The key points seem to be these:

1. Humans (or some of them), acting as programers, are not only intelligent enough to tell a computer how to carry out a specific procedure, but, in addition, to give a computer rules that permit it to learn--that is, to arrive at its own generalized procedures. [1, 2.]

2. It seems important that learning procedures contain some random elements--that is, provide the opportunity to try a new sub-routine at random from time to time.

3. The main distinction between the way one (now) programs a computer, and the way one instructs a human or will instruct a "learning machine" is this: "A machine is instructed mainly in the form of a sequence of imperative sentences; while a human is instructed mainly in declarative sentences, describing the situation in which action is required together with a few imperatives that say what is wanted."[3]

Two levels of machine language for learning

The development of learning machines is proceeding at two levels. The major difference between the two is in the level of language with which the machine operates. "One method, which might be called the Neural-Net Approach, deals with the possibility of inducing learning behavior into a randomly-connected switching net"[2]... assuming some goal, such as recognizing a character, is given to the machine. The language of these self-organizing devices is a very basic on-off (binary) language.

The second level is to instruct a computer, through programing, to deal with a language approaching that used by humans. Often, in present research, this language is restricted to a particular subject such as chess or music. Progress is being made at both levels, the latter (often called "artificial intelligence") being of more interest to management.

Computers programed to play a game have been developed by several groups.[2] These computers do not just remember their previous good and bad moves and use this experience; they actually develop general principles, such as the principle of "opposition" in checkers or the rules of harmony in music. It is not too difficult to go from this to imagining machines that will learn about advertising campaigns, capital investment, personnel policies, and other top management problems.

Learning machines are coming soon

Several learning machines are definitely feasible and are being developed now. They will probably be economically justified within several years. Some of these are for character recognition.[4] Other interesting applications for learning programs are preparation of abstracts, and language translation.

Learning is valuable when one deals with a more complex application, such as a petroleum refinery. It is difficult to program a computer to be prepared to handle all situations. It would be desirable to use a learning program which eventually teaches itself to handle a wide variety of situations and objectives. Much thinking is going into this sort of control, but there is little progress to report, as the complexity of the problem is many times greater than in checkers or character recognition.

For understanding complex business procedures

The important point for the practicing manager is that a number of thoughtful, respected researchers now feel that computers can be made as smart as (if not smarter than) humans, and their results to date are all encouraging. Breakthroughs in the programing of learning approaches and in inexpensive computer equipment (which will permit the realizations of these approaches economically) can be expected during the next ten years.

The benefits of this research to management will be these:

1. Learning machines may be the only way we will have to gain an understanding of complex business procedures. This will be done by generating a learning simulation which teaches itself to react in the same way as an actual business situation. Then the simulation can be used for testing new policies with a high expectation of accurate predictions.

2. Learning machines are conceivable which can learn to carry out many top management functions.

Keep an eye on the progress of learning devices and programs!

(The assistance of Mr. Joe Hawkins, Aeronutronic Division, Ford Motor Co., in preparing this Comment is appreciated.)

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1. Simon, H. A. and Newell, "Heuristic Problem Solving; the Next Advance in Operations Research," OPERATIONS RESEARCH, Jan.-Feb. 1958; pages 1-10. DPD, June 1958, page 10.

2. Samuel, A. L., "Some Studies in Machine Learning Using the Game of Checkers," IBM JOURNAL OF RESEARCH AND DEVELOPMENT, July 1959; pages 211-229. DPD, September 1959, page 11.

3. McCarthy, J., "Programs with Common Sense," Paper 1-1, National Physical Laboratory, Teddington, Middlesex, England.

4. Selfridge, O.G., "Pattern Recognition and Learning" in INFORMATION THEORY, 3RD LONDON SYMPOSIUM, edited by C. Cherry, Academic Press, N. Y., 1956.

(Most of the above give further references.)

Training

Management Concepts in Operations Research
Date: October 19-21, 1959
Place: Boston, Mass. (Harvard Club)
Fee: $200
Information: Harvey N. Shycon Co., Park Square Building, Boston, Massachusetts

AMA Systems and Procedures Course
Unit II: October 26-30, 1959
Ambassador Hotel, Los Angeles
Unit III: November 30 - December 4, 1959
Ambassador Hotel, Los Angeles
Information: Andrews M. Lang, American Management Association Academy, Saranac Lake, New York

Engineering and Management Course
Date: January 25--February 4, 1960
Place: University of California, Los Angeles
Fee: $400
Information: College of Engineering, University of California, Los Angeles 24, California

Meetings

1959 International Systems Meeting, Systems and Procedures Association of America
Date: October 12-14, 1959
Place: Toronto, Ontario (Royal York Hotel)
Information: Systems and Procedures Association, 4463 Penobscot Building, Detroit 26, Michigan

15th Annual National Electronics Conference
Date: October 12, 13, 14, 1959
Place: Hotel Sherman, Chicago, Illinois

Alwac Users Association Meeting
Date: October 19-21, 1959
Place: Chicago, Illinois

Sixth Annual Computer Applications Symposium
Date: October 28-29, 1959
Place: Morrison Hotel, Chicago, Illinois
Information: Sponsored by Armour Research Foundation

Equipment Systems Conference and Exhibit, sponsored by The Navy, City and County of San Diego, local colleges, schools, and professional organizations
Date: October 28-30, 1959
Place: San Diego, California (Conference Building, Balboa Park)
Information: Equipment Systems Conference, c/o H. J. Anderson Company, 1825 El Cajon Blvd., San Diego 3, California

GUIDE Organization Meeting
Date: November 1, 1959
Place: Atlanta, Georgia

Operations Research Society of America National Meeting
Date: November 11-13, 1959
Place: Pasadena, California (Huntington Sheraton Hotel)
Information: ORSA, Mt. Royal and Guilford Aves., Baltimore 2, Maryland

Eastern Joint Computer Conference
Date: December 1-3, 1959
Place: Boston, Massachusetts (Statler Hilton Hotel)

Sixth National Symposium of Reliability and Quality Control
Date: January 11-13, 1960
Place: Statler Hilton Hotel, Washington, D. C.

66th Annual American Mathematical Society Meeting
Date: January 27-29, 1960
Place: Conrad-Hilton Hotel, Chicago, Illinois

SHARE XIV Meeting
Date: February 15-19, 1960
Place: Statler Hilton Hotel, Los Angeles, California

IRE National Convention
Date: March 21-24, 1960
Place: Coliseum and Waldorf Astoria Hotel, New York, New York

Western Joint Computer Conference
Date: May 2-6, 1960
Place: San Francisco, California

Conference on Automatic Computing and Data Processing in Australia, sponsored by the Australian National Committee on Computation and Automatic Control

Date: May 24-27, 1960
Place: University of Sydney and University of New South Wales
Information: C. H. D. Harper, Secretary, Australian National Committee on Computation and Automatic Control, c/o The Institution of Engineers, Science House, 157 Gloucester Street, Sydney, Australia

National ACM Conference

Date: August 23-25, 1960
Place: Marquette University, Milwaukee, Wisconsin

DATA PROCESSING DIGEST is published each month by Canning, Sisson and Associates, Inc., 1140 South Robertson Boulevard, Los Angeles 35, California. Subscription rate: $24.00 per year. Foreign postage (exclusive of Canada and Mexico): $2.50 additional. Single copies: $3.00 when available. Editor: Margaret Milligan.

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